SOME NOTES ON HYBRIDISATION OF ERICACEAE IN THE KLAVER VALLEY AT SIMONSTOWN.

By

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I. SUPPOSED INTER-GENERIC HYBRIDS (BLAERIA × SIMOCHEILUS).

Examination of an extensive collection of specimens of *Blaeria ericoides*, L. and *Simocheilus depressus*,* Benth., recently made by me in the Klaver Valley, Simonstown (during February, 1936) has revealed a large number of intermediates between these two plants.

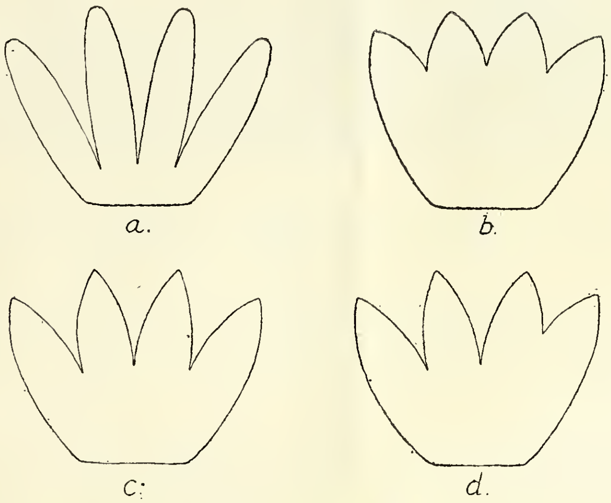

FIG. 1. Calyces lying flat. a, *Blaeria ericoides*. b, *Simocheilus depressus*. c, Normal hybrid. d, *Salter* 5936. All × 20. Del. T. M. Salter.

The two supposed parents are very similar in appearance and although, with practice, the pure, or at any rate the extreme forms can be recognised with the naked eye, some of them (apart from the hybrids) required close examination with a lens before they could be allocated to their respective genera. Both are abundant in the vicinity and often grow in association.

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* And/or *Simocheilus glabellus*, Benth., which, as the late Dr. N. E. Brown seems to have suspected, is probably conspecific (*vide* Flora Capensis, Vol. IV, Sec. I, p. 365).

The characters upon which I have formed my conclusions, indeed the only really obvious characters separating these two plants, are as follows :

Blaeria ericoides, L. Sepals almost free. Ovary 4-celled : cells 2—10-ovuled.

Simocheilus depressus, Benth. Calyx with 4 converging teeth about $\frac{1}{3}$ the length of the tube. Ovary 2-celled : ovules solitary in each cell.

In the case of the supposed hybrids, *Salter* 5815, 5887, 5890, 5912, 5914, 5915, 5917, 5918, 5919, 5935, 5936, 5938, 5941, and 5942, the calyx teeth are almost all about equal in length to the tube, but not so closely converging (i.e., squeezing the corolla) as those in Simocheilus. In one plant, however, (*Salter* 5936) the calyces are remarkable, two of the teeth being short and converging inwards slightly, while the other two are about equal in length to the tube as in the normal hybrids. (See Fig. 1 (*d*).) A summary of the particulars of the ovaries of 85 flowers, taken at random from 15 of these plants, is shown in the following table :

Ovary-cells.	*Ovules.*	*Flowers so found.*
4	2–2–2–2	4
4	1–1–1–1	3
3	4–3–2	1
3	2–1–1	7
3	1–1–1	11
2	7–3	1
2	4–3	1
2	5–2	1
2	4–2	3
2	3–2	17
2	3–1	5
2	2–2	14
2	2–1	13
2	1–1	2
1*	7	1
1*	6	1

The bracts vary from 1 to 3, two being the commonest number and in a few plants the anthers are spurred.

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* In these cases and in several others, traces were found of rudimentary septa, not reaching to the central axis. See Fig. 2 (*a*) and (*b*). The ovules are pendulous on the upper swollen portion of the central axis and, where numerous, are somewhat imbricated as in *Blaeria ericoides*. See Fig. 2 (*c*).

Some of the plants show a marked tendency to abnormality and monstrosity in the flowers, a fact which seems to provide further evidence of their hybrid origin. Sixteen flowers, forming one inflorescence from *Salter* No. 5936 illustrate this point :—

No. of flowers.		*Details of structure.*
9	..	Normal. Calyx and corolla 4-lobed. Stamens 4.
4	..	Calyx and corolla 4-lobed. Ovary, style and stamens absent.
1	..	Calyx 8-lobed, containing 2 complete otherwise normal flowers.
1	..	Calyx 6-lobed, with a second 3-lobed partial outer calyx imbricating it. Corolla 8-lobed. Ovaries 2 ; styles 2 ; stamens 8.
1	..	Calyx and corolla 5-lobed. Stamens 5.

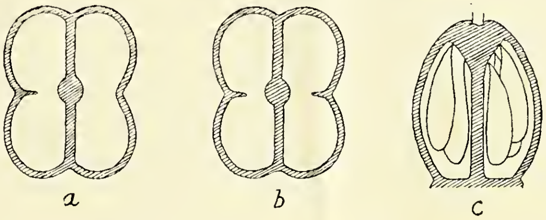


Fig. 2. *Blaeria ericoides* × *Simocheilus depressus.* a and b, Cross section of ovaries. c, Vertical section of ovary showing placentation. All × 20. Del. T. M. Salter.

The ovary-cells and number of ovules were also variable.

It is very possible that the plants previously referred to, which, although conforming to the recognised generic characters, could not be distinguished by their appearance, may be segregates very closely related to the original parents.

The foregoing evidence of hybridisation between these two genera raises the question whether the division of the South African minor Ericaceae into micro-genera has been carried too far. Almost the whole classification of these plants into genera and species has been carried out by European botanists on the evidence of an absurdly limited quantity of material and it is only after attempting to dissect old dried specimens in these genera that their patience can be realised. It is very desirable that these plants should be more extensively collected in order to enable some future monographer more opportunity of reviewing them. Owing to their variation a number of small specimens from several plants growing in one locality are of infinitely more value than one large showy specimen, but the rough height and nature of the plant should of course be stated.

II. SUPPOSED ERICA HYBRIDS.

While investigating the plants referred to in Section I., I found, also in the Klaver Valley, Simonstown, a number of apparent hybrids :—(*a*) *Erica laeta*, Bartl. × *Erica heleogena*, Salter and (*b*) *Erica hirtiflora*, Curt × *Erica heleogena*, Salter.

(*a*) *Erica laeta*, Bartl. × *Erica heleogena*, Salter. Of the specimens of this hybrid collected (*Salter* 5795, 5893, 5895, 5894, 5927 and 5928) particulars of the floral characters of the first three, as compared with those of *E. laeta* (*Salter* 5899) and *E. heleogena* (*Salter* 5797) are shown in Fig 3.

In all the specimens the habit of the plant is intermediate, that of 5795 being nearest *E. laeta*, that of 5895 nearest *E. heleogena* and 5893 is between the two. Generally speaking a similar transition can be traced in the leaves and in the floral characters, e.g., the shape and indument of the corolla, length of the anther appendages, etc. The same transition is, however, not borne out in the colour of the corolla, in fact the opposite is the case ; 5795 being pale rose, 5893 rose and 5895 rose-red, but all the hybrids are intermediate in colour between the parents. None of them has muticous anthers as in *E. heleogena* : the awns, some of which are shortly decurrent on the filaments, vary in length, but I can find no perceptible trace of the characteristic laceration of the anther-crests of *E. laeta*.

(*b*) *Erica hirtiflora*, Curt × *Erica heleogena*, Salter. A large range of specimens of this hybrid was collected (*Salter* 5896, 5929, 5959, 5962 and also 5897, 5931 to 5933, 5960, 5961, 5963 to 5966 and 5968. Particulars of the floral characters of the first four together with those of *E. hirtiflora* (*Salter* 5898) are shown in Fig. 3.

All the specimens show intermediate characters, the corollas being noticeably hispid, though less so than in *E. hirtiflora*, and always having a tendency to close at the mouth. The anthers vary but are all more or less intermediate in shape, and the long narrow crests of E. *hirtiflora* are much reduced in size.

In these, however, a definite transition is not so easy to trace. In general appearance and in the shape of the corolla 5896 is perhaps nearest to *E. hirtiflora* and 5892 to *E. heleogena*, but the other characters are somewhat indeterminate. The corollas of 5896 and 5962 are very pale pink and 5929 and 5959 a darker and more rosy pink, but still paler than *E. hirtiflora*.

These hybrids were far more numerous than those referred to in Section II. (*a*), four of them, all varying, being found almost within reach of one another, and hybridisation here seems to have reached a more complicated stage.

Fig. 3 (1).

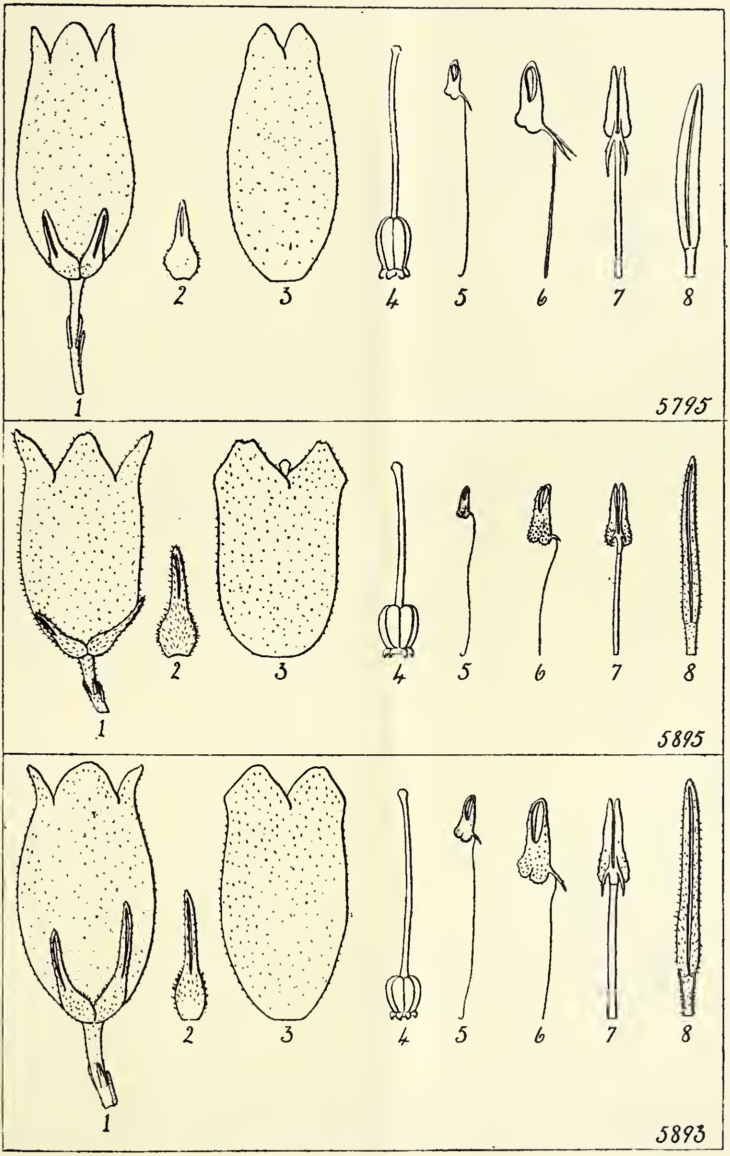
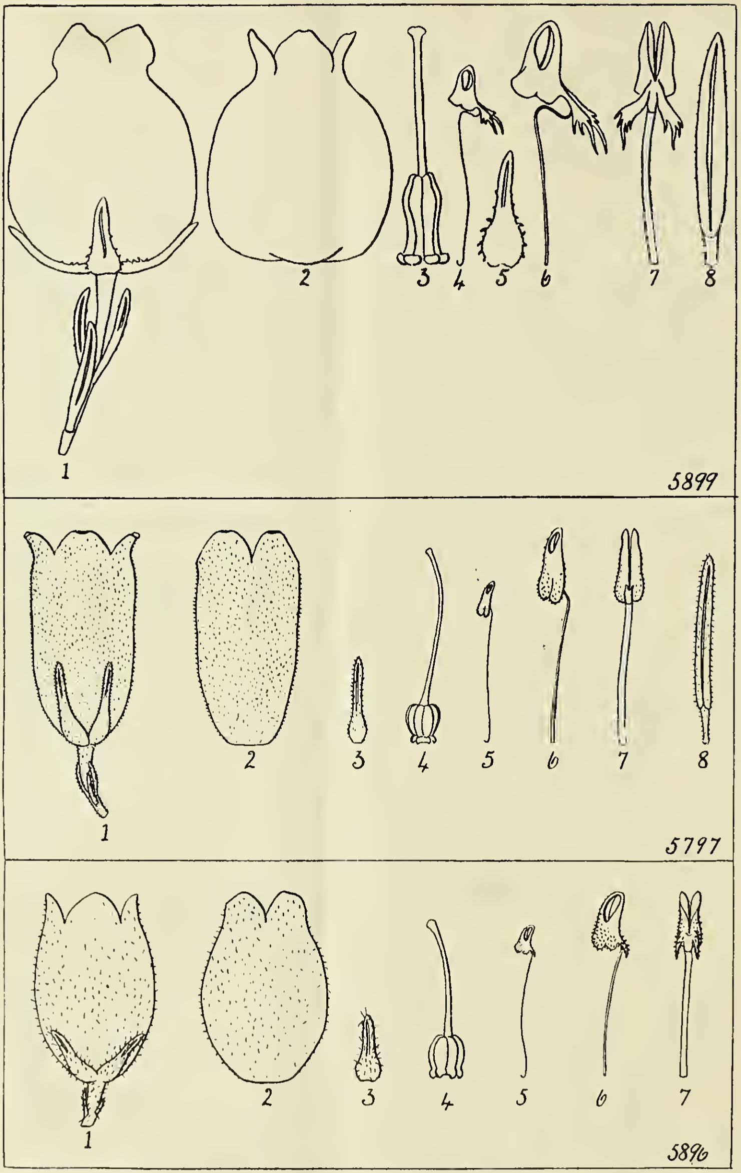


Fig. 3. 5795, 5895, and 5893. *Erica laeta* × *Erica heleogena*. 1. Flower × 6. 2. Sepal × 6. 4. Gynaecium × 6. 5. Stamen, side view × 6. 6. Anther, side view × 12. 7. Anther, back view × 12. 8. Leaf × 6.

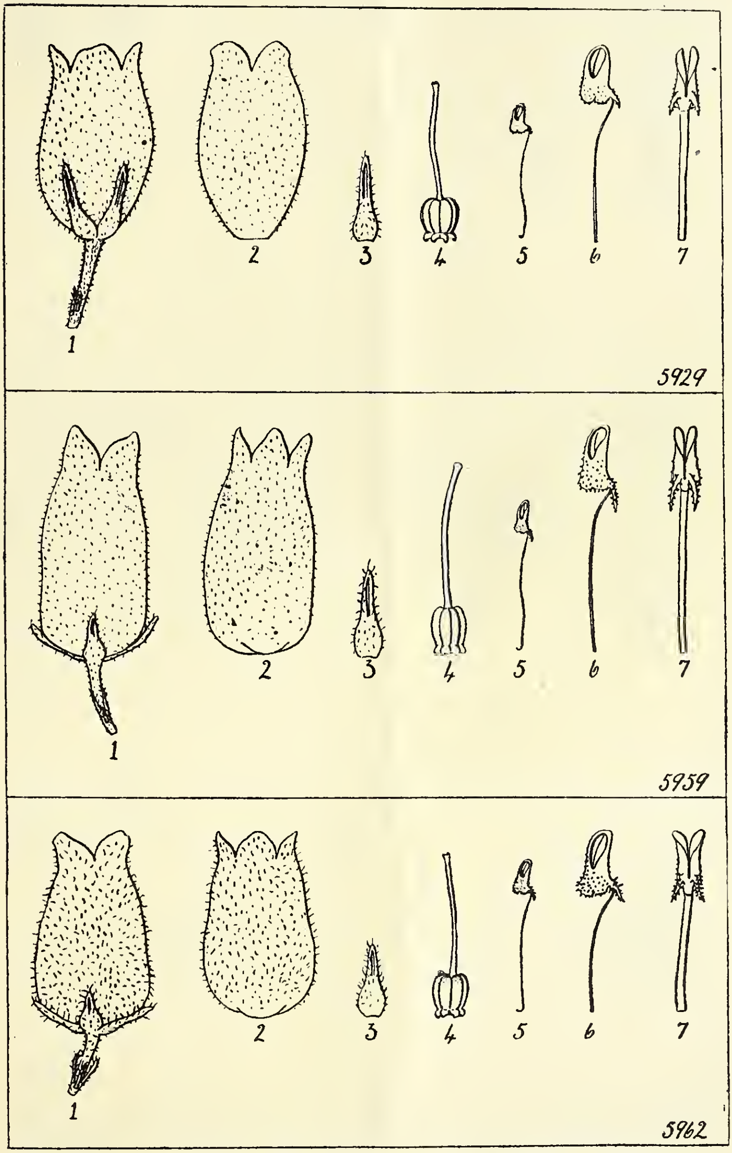
Fig. 3 (2).



5899. *Erica laeta*, Bartl. 1. Flower × 6. 2. Corolla × 6. 3. Gynaecium × 6. 4. Stamen, side view × 6. 5. Sepal × 6. 6. Anther, side view × 12. 7. Anther, back view × 12. 8. Leaf × 6.

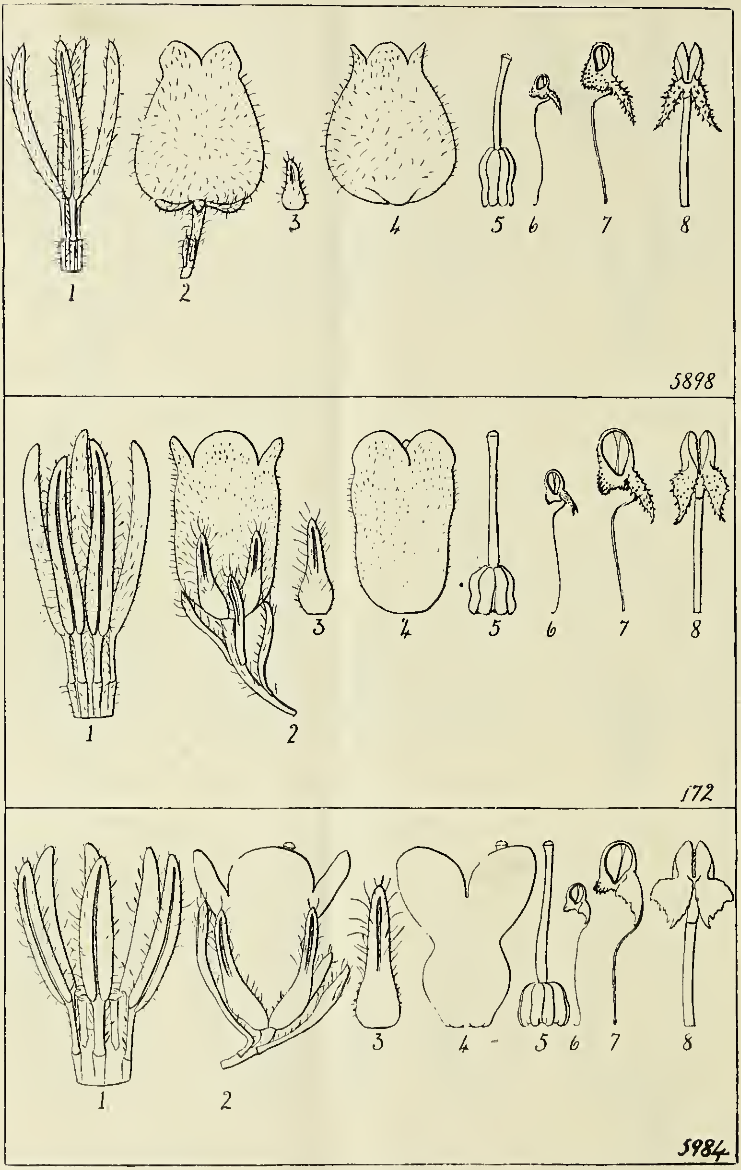
5797. *Erica heleogena* Salter. 1. Flower × 6. 2. Corolla × 6. 3. Sepal × 6. 4. Gynaecium × 6. 5. Stamen, side view × 6. 6. Anther, side view × 12. 7. Anther, back view × 12. 8. Leaf × 6.

Fig. 3 (3).



5896, 5929, 5959 and 5962. *Erica hirtiflora* × *Erica heleogena*. 1. Flower × 6. 2. Corolla × 6. 3. Sepal × 6. 4. Gynaecium × 6. 5. Stamen, side view × 6. 6. Anther, side view × 12. 7. Anther, back view × 12.

Fig. 3 (4).



5898. *Erica hirtiflora* Curt. 172. *Erica hirtiflora* × *Erica pyxidiflora*. 5984. *Erica pyxidiflora* Salisb. 1. Whorl of leaves × 6. 2. Flower × 6. 3. Sepal × 6. 4. Corolla × 6. 5. Gynaecium × 6. 6. Stamen, side view × 6. 7. Anther, side view × 12. 8. Anther, back view × 12. *Del.* W. F. Barker.

The marsh in which the hybrids occur is of considerable extent. It is the most southerly marsh in the valley, i.e., the highest on the main stream, and lies to the west of the point marked "Graves" on the Cape Peninsula map (1933). *Erica heleogena*, a true marsh species, is abundant in the marsh while *E. laeta* and *E. hirtiflora*, which might be described as semi-marsh species, preferring as they do the edges of marshes and banks of streams, are very plentiful on either side of it, while a limited number of both species occur in the marsh itself. The hybrids were all found in the marsh and near the supposed parents, but they do seem to grow away from *E. heleogena* on the drier borders.

I walked across this marsh some few years ago soon after it had been gutted by a fire which destroyed all the living heaths in it. In many parts of it progress is now difficult owing to the dense waist-high, or in places head-high vegetation and I observed a plant of *E. heleogena* over 6 feet high with the base of the stem nearly an inch in diameter. It is evident that much of the huge quantity of seed that falls from the closely matted plants of this heath must lie dormant in the soil and ready to germinate and reclothe the marsh when room is made for it by the removal of its forbears, a fact borne out by the appearance of numerous seedling plants in a recently burnt part of the same marsh.

Direct hybridisation and inter-hybridisation of segregates has in all probability been going on in this locality for many years. It would be interesting to know whether these hybrids are on the increase and one can speculate whether, in the course of time, through some climatic or physical change, the marsh will ever become more suited to one of them than to the present predominating species *E. heleogena*, which might gradually take its place as a new so-called species.

A few seeds of both these supposed hybrids have been obtained and these, by the courtesy of the Director, will be planted at the National Botanic Gardens, Kirstenbosch. If they germinate successfully it is hoped that further confirmatory evidence of hybridisation will be obtained.

(*c*) On a later visit to the Klaver Valley in March a single plant was found by Miss W. F. Barker (*Barker* 172), which has all the appearance of being a hybrid between *Erica hirtiflora*, Curt. and *Erica pyxidiflora*, Salisb., two species which were growing plentifully in the same vicinity, but which do not, from their appearance, seem to have any close affinity one with the other and are included in entirely different sub-sections of the genus. There was at first some doubt about the possibility of a cross between these species, as the latter was not in flower, but on making an exhaustive, but unsuccessful search for more of these plants about a month later, the flowering of the supposed parents was found to be just overlapping.

E. hirtiflora, which is, at any rate in the upper part, a rather densely bushy species with very numerous flowers, terminal on short branchlets, and with 4-nate leaves, was growing locally to about 70 cm. in height. In *E. pyxidiflora* the branches are few, long, erect and widely separate, with closely imbricate leaves, which are most commonly 6-nate : the inflorescences are compact and cylinder-shaped with congested axillary flowers and the height is generally 40—50 cm.

The hybrid is intermediate in habit and about 30 cm. in height, but is evidently a young plant. The flowers, terminal on very short branchlets, are arranged in long pseudo-racemes and the leaves which are more loosely imbricate are mostly 5-nate or rarely 4-nate. The corolla is rosy-pink in colour, *i.e.* intermediate between the parents.

Dissections of the flowers in comparison with those of *E. hirtiflora* (*Salter* 5898) and *E. pyxidiflora* (*Salter* 5984) are shown in Fig. 3. The corolla is nearest to that of *E. hirtiflora*, but has a much wider mouth and there are slight traces of the characteristic constriction so noticeable in *E. pyxidiflora*. The other intermediate characters, *e.g.* the bracts, sepals and anther crests are self-evident. The pollen grains which are slightly smaller than those of the parents, appear to be good and the ovules normal.

Mention has already been made in this Journal (Vol. I, pp. 35 and 82) of the hybrids *E. laeta*, Bartl., × *E. capensis*, Salter, and × *E. fontensis*, Salter (*i.e. E. capensis*, Salter, × *E. fontana*, L. Bolus), which occur in the more southern areas of the Cape Peninsula. No doubt, with careful observation, others will come to light.

Large numbers of artificial and accidental garden hybrid heaths are, of course, well known, but until quite recent years there seems to be no evidence of observation of their occurrence in the natural state. Owing to this lack of evidence it is impossible to ascertain whether any of our named wild species (some of which have been only once collected)* are merely hybrids, as is now known to be the case with some species in other genera which hybridise freely. It can scarcely be coincidence that the four almost certain hybrid combinations referred to in this article have been found growing within an area of less than one square mile. It seems, therefore, essential that the collector should be fully conscious of the possibility of finding hybrid forms, even between parents of very different appearance, and should, when coming upon an apparently new heath, either take careful note of what other species are growing in the vicinity, or, better, procure specimens of them as well, for not even the most erudite botanist can recognise all our 600 odd species of Ericaceae in the field.

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* It is a lamentable fact that so many of the "*types*" of our South African heaths were grown in Europe from seed of unknown origin.

I have, like most collectors, experienced the chagrin of having my discoveries determined as " nearest such and such " a species, a solution which seems at first sight to be most unsatisfactory. This state of affairs can only be understood after some experience of herbarium work and detailed investigation of plants which, on account of the existence of intermediate forms, have to be grouped together unless our so-called species are to swell to an infinite number. It is of course generally recognised that herbarium work, by its very essence, imposes an artificial system of sorting upon what are in reality the results of a continuous and ever-changing evolutionary process, but I believe that with careful field observation, such as I have outlined above, some light at least might gradually be shed on the mass of " variant " heaths which, to the despair of taxonomists, are now housed in herbaria, sometimes even without records of where they were collected and never with any notes on the species growing in association.

A specimen accompanied with full field notes is worth more to science than dozens of even " historical " specimens without them, as can well be realised when it is considered that any one of the hybrids referred to in this article would, without such notes, have almost certainly been looked upon by a monographer as a *new species.*